Problem Set 1

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Problem 1

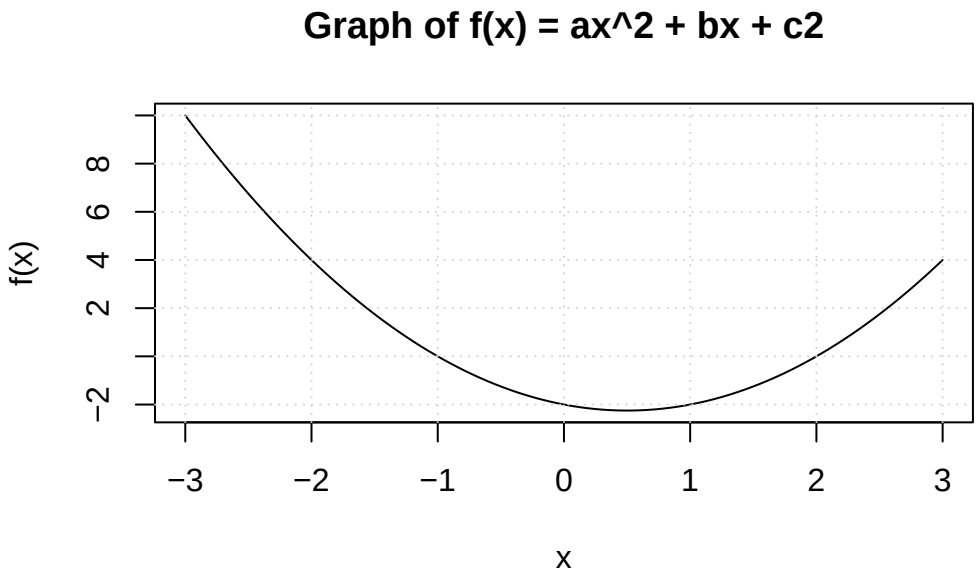
Define variables $a = 1$, $b = -1$, $c = -2$ and print out the solutions to $f(x) = ax^2 + bx + c = 0$. Do not report complex solutions, only real numbers. Avoid using the variable name `c` as it is a reserved function in R. Show the code and the answer.

```
# Define function to solve for a, b, and c2
solve_quadratic <- function(a, b, c2) {
    # Calculate discriminant
    discriminant <- b^2 - 4*a*c2

    # Check if the discriminant is non-negative
    if (discriminant >= 0) {
        # Calculate the two real solutions
        x1 <- (-b + sqrt(discriminant)) / (2*a)
        x2 <- (-b - sqrt(discriminant)) / (2*a)

        # Print the solutions
        cat("The solutions are:", x1, "and", x2, "\n")
    } else {
        cat("There are no real solutions.\n")
    }
}

# Solve for a=1, b=-1, c=-2
solve_quadratic(1,-1,-2)
```

```
The solutions are: 2 and -1
```

Problem 2

Show a graph of $f(x)$ versus x for $x \in (-3, 3)$. Do not show the code, only the graph.



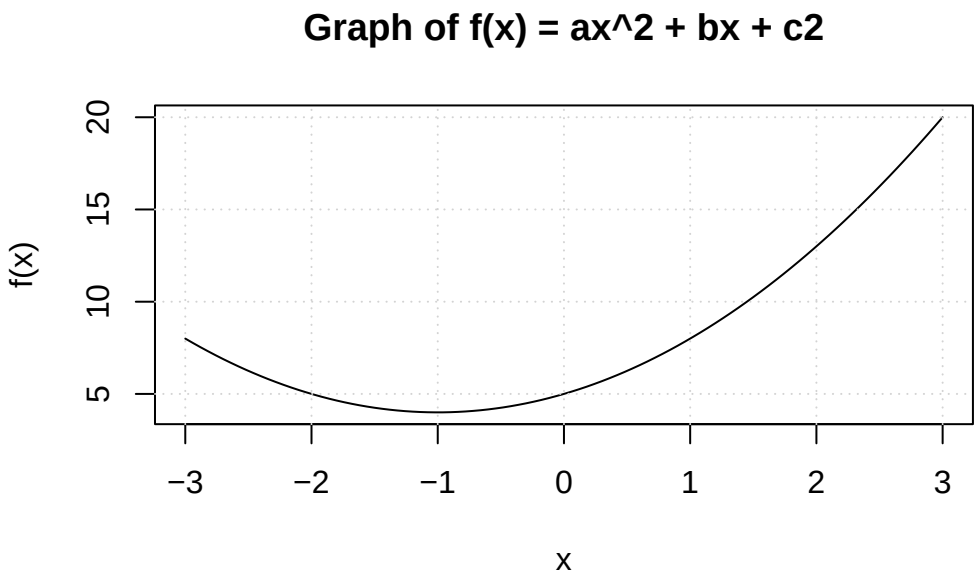
Problem 3

Generate a PDF report.

Problem 4

Erase the PDF report and reproduce it but this time using $a = 1$, $b = 2$, $c = 5$.

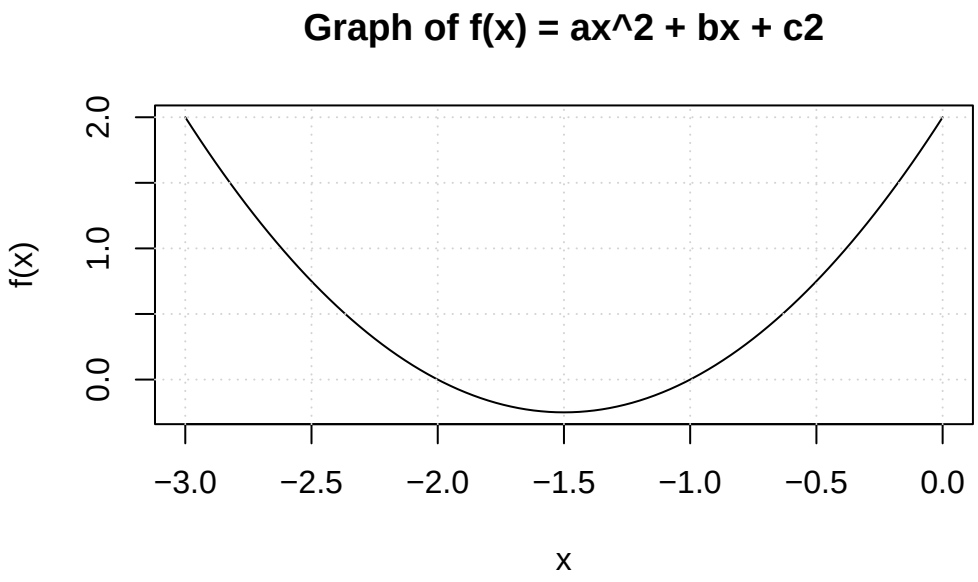
```
There are no real solutions.
```



Problem 5

Erase the PDF report and reproduce it but this time using $a = 1$, $b = 3$, $c = 2$. Change the range of `x` to range that clearly shows the roots.

```
The solutions are: -1 and -2
```



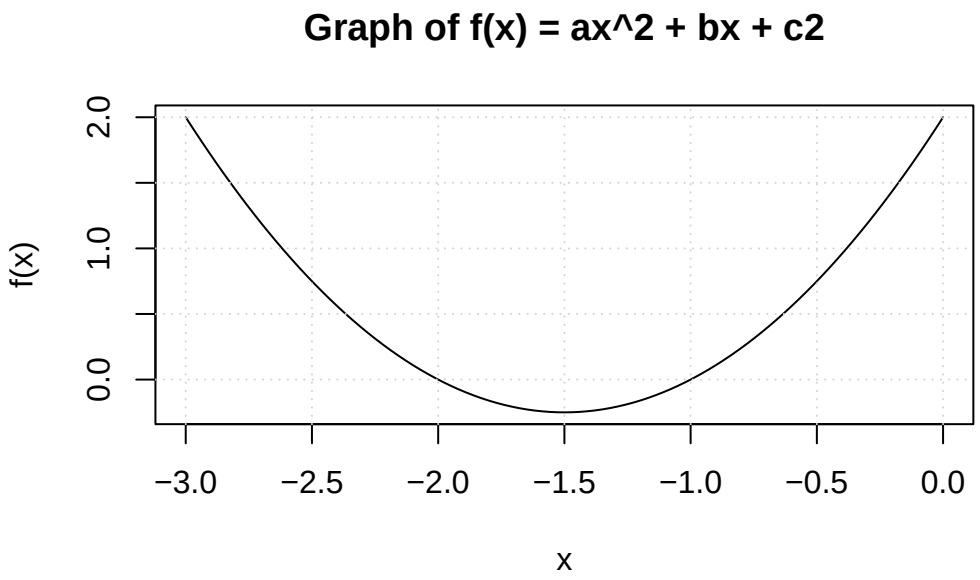
Problem 6

Create a markdown page with the results for this last set of values, but this time showing the code.

```
# Solve for and plot a=1, b=3, c=2
solve_quadratic(1,3,2)
```

```
The solutions are: -1 and -2
```

```
plot_quadratic(1,3,2,-3,0)
```



Problem 7

Submit the markdown page, including all necessary auxiliary files, and quarto file to a GitHub repo. Make sure the markdown document renders.